

Safe, Non-Corrosive Dielectric Fluid for Stagnating Radiator Thermal Control System, Phase I

Completed Technology Project (2007 - 2007)



Project Introduction

Paragon proposes to develop a single-loop, non-toxic, stagnating active pumped loop thermal control design for NASA's Orion or Lunar Surface Access Module (LSAM) program. While this technology was developed in the Apollo era, it has not been used in space since then. Furthermore, the fluids used in those first-generation units are not compatible with today's human-rated flight requirements as they could be considered toxic and/or flammable. Though work at JSC by Tuan et al. has targeted modeling and verifying the model of a stagnating radiator with one candidate fluid, Paragon proposes to parallel this effort with an alternative fluid as a back-up to that currently base-lined in the Orion program. This technology will be a significant innovation in that stagnating radiator designs provide self regulation of thermal dissipation parameters. As heat flow to the radiator is reduced, less cooling capacity is required; stagnating radiators incorporate fluids that gradually change properties. If increased heating loads are encountered, the radiator working fluid changes again to increase the heat transfer capability of the radiator. This technology is directly relevant to NASA's Orion and LSAM development. Our plan for Phase I and II is in-line with bringing this technology from a TRL 2 to a TRL 4-6 depending on Phase II assumptions.

Anticipated Benefits

Potential NASA Commercial Applications: Assuming successful implementation of Phase I and II activities, this enabling technology will also be of extreme value to an emerging commercial space industry. This includes the following types of spacecraft: High power commercial satellites and emerging commercial orbital flight vehicles such as Bigelow's space hotels.



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Table of Contents

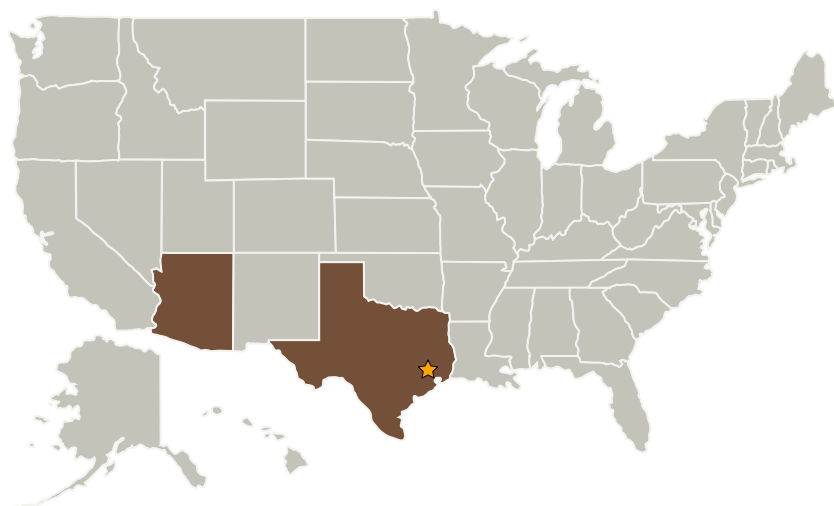
Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Areas	2

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Paragon Space Development Corporation	Supporting Organization	Industry	Tucson, Arizona

Primary U.S. Work Locations	
Arizona	Texas

Project Transitions

January 2007: Project Start

July 2007: Closed out

Closeout Summary: Safe, Non-Corrosive Dielectric Fluid for Stagnating Radiator Thermal Control System, Phase I Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Christine Iacomini

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.2 Thermal Control Components and Systems
 - └ TX14.2.3 Heat Rejection and Storage